CLAIMS

1. In a computer network comprising a plurality of intermediate nodes, a method for gracefully shutting down a resource contained in an intermediate node, the method comprising the steps of:

advertising to other intermediate nodes in the network that a resource is being gracefully shut down;

determining if a condition that warrants shutting down the resource is met; and

if the condition is met, shutting down the resource.

2. A method as defined in claim 1 wherein the resource is a protocol.

3. A method as defined in claim 1 wherein the resource is an interface.

4. A method as defined in claim 1 wherein the resource is a node.

5. A method as defined in claim 1 comprising the steps of:

entering one or more commands into the intermediate node to indicate the resource is being gracefully shutdown; and

advertising the resource is being gracefully shut down.

6. A method as defined in claim 1 comprising the steps of:

monitoring the resource to determine if the resource should be gracefully shut down; and

if so, advertising the resource is being gracefully shut down.

7. A method as defined in claim 1 wherein the intermediate node is coupled to one or more neighboring intermediate nodes in the plurality of intermediate nodes.

8. A method as defined in claim 7 comprising the steps of:

generating an advertisement message containing an overload bit that is asserted; and

flooding the advertisement message to the neighboring intermediate nodes.

9. A method as defined in claim 7 comprising the steps of:

generating an advertisement message containing an age value set to a maximum age; and

flooding the advertisement message to the neighboring intermediate nodes.

10. A method as defined in claim 7 comprising the steps of:

generating an advertisement message that associates the resource with a maximum cost; and

flooding the advertisement message to the neighboring intermediate nodes.

11. A method as defined in claim 7 comprising the steps of:

generating an advertisement message containing costs associated with non-stub links set to LSInfinity and costs associated with stub links set to an interface output cost; and

flooding the advertisement message to the neighboring intermediate nodes.

12. A method as defined in claim 7 comprising the steps of:

advertising the resource to the neighboring intermediate nodes;

generating an advertisement message that omits the resource; and

flooding the advertisement message to the neighboring intermediate nodes.

13. A method as defined in claim 7 comprising the steps of:

generating an advertisement message containing a graceful shutdown type-length-value field; and

flooding the advertisement message to the neighboring intermediate nodes.

14. A method as defined in claim 13 wherein the advertisement message contains information that identifies the resource being gracefully shut down.

15. A method as defined in claim 1 wherein the condition is an expiration of a predetermined period of time.

16. A method as defined in claim 1 wherein the condition is the resource reaching a predetermined level of activity.

17. An intermediate node contained in a data network comprising a plurality of intermediate nodes, the intermediate node comprising:

a resource; and

a processor configured to:

a) advertise to other intermediate nodes in the network that the resource is being gracefully shut down,

b) determine if a condition that warrants shutting down the resource is met and

c) if the condition is met, shutting down the resource.

18. An intermediate node as defined in claim 17 wherein the resource is a protocol.

19. An intermediate node as defined in claim 17 wherein the resource is an interface.

20. An intermediate node as defined in claim 17 wherein the resource is a node.

21. An intermediate node as defined in claim 17 wherein the processor is configured to monitor the resource to determine if the resource warrants being gracefully shut down and if so, advertise the resource is being gracefully shut down.

22. An intermediate node as defined in claim 17 wherein the processor is configured to advertise the resource is being gracefully shut down in response to one or more commands entered into the intermediate node.

23. An intermediate node as defined in claim 17 wherein the intermediate node is coupled to one or more neighboring intermediate nodes contained in the plurality of intermediate nodes.

24. An intermediate node as defined in claim 23 wherein the processor is configured to generate an advertisement message containing an overload bit that is asserted and flood the advertisement message to the neighboring intermediate nodes.

25. An intermediate node as defined in claim 23 wherein the processor is configured to generate an advertisement message containing an age value set to a maximum age and flood the advertisement message to the neighboring intermediate nodes.

26. An intermediate node as defined in claim 23 wherein the processor is configured to generate an advertisement message that associates the resource with a maximum cost and flood the advertisement message to the neighboring intermediate nodes.

27. An intermediate node as defined in claim 23 wherein the processor is configured to generate an advertisement message containing costs associated with non-stub links set to LSInfinity and costs associated with stub links set to interface output cost and flood the advertisement message to the neighboring intermediate nodes.

28. An intermediate node as defined in claim 23 wherein the processor is configured to generate an advertisement message that omits the resource that is being gracefully shut down and flood the advertisement message to the neighboring intermediate nodes.

29. An intermediate node as defined in claim 23 wherein the processor is configured to generate an advertisement message containing a graceful shutdown type-length-value field and flood the advertisement message to the neighboring intermediate nodes.

30. An intermediate node as defined in claim 29 wherein the advertisement message contains resource information that identifies the resource being gracefully shut down.

31. An intermediate node contained in a data network comprising a plurality of intermediate nodes, the intermediate node comprising:

a resource;

means for advertising the resource is being gracefully shut down to other intermediate nodes in the network;

means for determining if a condition warranting the graceful shutdown of the resource is met; and

means for shutting down the resource if the condition is met.

32. A computer readable medium comprising computer executable instructions for execution in a processor for:

advertising a resource contained in an intermediate node is being gracefully shut down to other intermediate nodes in a network;

determining if a condition that warrants shutting down the resource is met; and

if the condition is met, shutting down the resource.

33. A computer readable medium as defined in claim 32 wherein the condition is the expiration of a predetermined period of time.

34. A computer readable medium as defined in claim 32 wherein the condition is the resource reaching a predetermined level of activity.

35. In a computer network comprising a plurality of intermediate nodes, a method for gracefully shutting down a resource contained in an intermediate node wherein the resource is associated with one or more connections, the method comprising the steps of:

notifying a head-end node of each connection associated with the resource that the resource is being gracefully shut down;

determining if a condition associated with the graceful shutdown of the resource is met; and

if the condition is met, shutting down the resource.

36. A method as defined in claim 35 comprising the steps of:

for each connection:

a) establishing an alternative connection;

b) switching traffic from the connection to the alternative connection; and

c) tearing down the connection.

37. A method as defined in claim 35 wherein the condition is the expiration of a predetermined period of time.

38. A method as defined claim 35 wherein the condition is the resource reaching a predetermined level of activity.

39. A method as defined claim 35 wherein the condition is a head-end node associated with a connection signaling that the connection is being torn down.

40. In a computer network comprising a plurality of intermediate nodes, a method for gracefully shutting down a resource contained in an intermediate node wherein the resource is associated with one or more connections and one or more connectionless protocols, the method comprising the steps of:

gracefully shutting down the one or more connections;

determining if a first condition associated with shutting down the connections is met;

gracefully shutting down the one or more connectionless protocols;

determining if a second condition associated with the shutting down the connectionless protocols is met;

determining if a condition associated with the graceful shutdown of the resource is met; and

if the condition is met, shutting down the resource.

41. A method claim 40 wherein the first condition is the expiration of a predetermined period of time.

42. A method claim 40 wherein the first condition is the resource reaching a predetermined level of activity.

43. A method claim 40 wherein the second condition is an expiration of a predetermined period of time.

44. A method claim 40 wherein the second condition is the resource reaching a predetermined level of activity.

45. A method claim 40 wherein the second condition is a signal from a head-end node associated with a connection, that is associated with a connectionless protocol being shut down, indicating that the connection is being torn down.